

CLAIMS:

1. A process for cleaning a surface of a substrate, said surface carrying thereon a high-density film and a low-density film lower in density than said high-density film in combination, which comprises bringing a mixed gas of anhydrous hydrogen fluoride gas and a heated inert gas into contact with said surface of said substrate such that at least a portion of said low-density film is removed without impairing said high-density film beyond a tolerance.

10 2. A process according to claim 1, wherein said high-density film is a film necessary for said substrate and said low-density film is a film unnecessary for said substrate.

15 3. A process according to claim 1, wherein said low-density film includes impurities thereon or therein, and said impurities are removed together with said low-density film.

4. A process according to claim 1, wherein said mixed gas further comprises steam added therein.

5. A process according to claim 1, wherein said substrate is a silicon substrate, said high-density film is a thermal oxide film, and said low-density film is a natural oxide film formed on said surface of said substrate or an oxide film formed with a chemical solution on said surface of said substrate.

20 6. A process according to claim 1, wherein said substrate is a substrate for a semiconductor device.

25 7. A process according to claim 6, wherein said

high-density film is formed on said substrate via a substrate layer.

8. A process according to claim 1, wherein said mixed gas is maintained at a temperature between room temperature and 200°C.

9. A process according to claim 1, wherein said mixed gas is maintained at a temperature between room temperature and 100°C.

10. A process according to claim 1, wherein said surface of said substrate is maintained at a temperature between 30°C to 50°C.

11. A process according to claim 1, wherein said mixed gas has a flow rate of from 40 to 60 L/min.

12. A process according to claim 1, wherein a concentration of anhydrous hydrogen fluoride gas contained in said mixed gas is in a range of from 1 vol.% to 3 vol.%.

13. A process according to claim 1, wherein a concentration of anhydrous hydrogen fluoride gas contained in said mixed gas is in a range of from 1.5 vol.% to 2 vol.%.